

WHAT IS CLAIMED IS

1. A method for non-random selection of a raw product of a selected plant for processing into a uniform quality end product comprising the steps of:

(a) obtaining a sample of the raw product of the selected plant;

(b) analyzing the sample to determine at least one structural or functional index associated with the raw product;

(c) providing a plurality of product processing feature range set records, wherein each of the records associates a given set of product processing data with a corresponding product processing feature range set, and wherein, for each such record, a uniform quality end product results from application of the given set of product processing data to raw product falling within the associated product processing feature range set;

(d) determining the suitability of the sample obtained in step (a) for processing into the uniform quality end product by comparing the at least one structural or functional index to product processing feature range sets in the records; and

(e) if the at least one structural or functional index matches one of the product processing feature range sets in the records then, selecting the raw product so that when processed under a given set of processing parameters, the selected raw product results in the uniform quality end product.

2. The method of claim 1, wherein the selected plant product is a group fruits, a group of tubers, a group of seeds, a group of leaves, a group of vegetative buds, a group of inflorescences, a group of nuts or a group of seeds of the crop plant.

3. The method of claim 1, wherein analyzing the sample is by means of an imaging system.

4. The method of claim 3, wherein the imaging system is a light microscope, fluorescent microscope, spectral microscope, hyper-spectral microscope, electron microscope, confocal microscope optical coherence tomograph telescope or spectral telescope, MRI or ultrasound.

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5. The method of claim 1, wherein the at least one structural or functional index is a plant phenomics index.

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6. The method of claim 5, wherein the plant phenomics is macrophenomics or microphenomics.

7. The method of claim 1, wherein the at least one structural or functional index includes a qualitative feature.

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8. The method of claim 1, wherein the at least one structural or functional index includes a quantitative feature.

9. The method of claim 1, wherein said processing data include bioprocessing data.

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10. A method for non-random selection of a crop plant that yields a selected raw plant product with uniform features for processing into a uniform quality end product comprising the steps of:

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- (a) obtaining a sample of the selected raw plant product of a crop plant;
- (b) analyzing the sample to determine at least one structural or functional index associated with the selected raw plant product;
- (c) providing a plurality of product processing feature range set records, wherein each of the records associates a given set of product processing data with a

corresponding product processing feature range set, and wherein, for each such record, a uniform quality end product results from application of the given set of product processing data to raw product falling within the associated product processing feature range set;

5 (d) determining the suitability of the sample for processing into the uniform quality end product by comparing the at least one structural or functional index to each product processing feature range set in the records; and

 (e) if the at least one structural or functional index matches one of the product processing feature range sets in the records then, selecting the crop plant for
10 growing under a selected set of growth conditions whereby the selected crop plant yields raw product suitable for processing into the uniform quality end product.

11. The method of claim 10, wherein the selected plant product is a group
fruits, a group of tubers, a group of seeds, a group of leaves, a group of vegetative
15 buds, a group of inflorescences, a group of nuts or a group of seeds of the crop plant.

12. The method of claim 10, wherein analyzing the selected plant product is by means of an imaging system.

20 13. The method of claim 12, wherein the imaging system is a light microscope, fluorescent microscope, spectral microscope, hyper-spectral microscope, electron microscope, confocal microscope, optical coherence tomograph telescope or spectral telescope, MRI or ultrasound.

25 14. The method of claim 10, wherein the at least one structural or functional index is a plant phenomics index.

15. The method of claim 14, wherein the plant phenomics is macrophenomics or microphenomics.

5 16. The method of claim 10, wherein the at least one structural or functional index includes a qualitative feature.

17. The method of claim 10, wherein the at least one structural or functional index includes a quantitative feature.

10 18. The method of claim 10, wherein said processing data include bioprocessing data.

15 19. A method for a non-random selection of a crop plant that yields a selected raw plant product with uniform features for processing into a uniform quality end product comprising the steps of:

(a) obtaining a sample of the selected raw plant product of the crop plant;

(b) analyzing the sample to determine at least one structural or functional index associated with the selected raw plant product;

20 (c) providing a plurality of product feature range set records, wherein each of the product feature range set records associates a given set of genetic information of a cultivar of the crop plant with a corresponding product feature range set and with a corresponding set of growth conditions suitable for growing the cultivar to produce the selected raw plant product with indices that fall within the associated product feature range set;

25 (d) identifying a first cultivar by comparing the at least one structural or functional index analyzed in step (b) to each of the records in step (c);

(e) providing a plurality of product processing feature range set records, wherein each of the product processing feature range set records associates a given

set of product processing data with a corresponding product processing feature range set, and wherein, for each such record, a uniform quality end product results from application of the given set of product processing data to raw product falling within the associated product processing feature range set;

5 (f) determining the suitability of the sample for processing into the uniform quality end product by comparing the at least one structural or functional index to each product processing feature range set in the records;

(g) if the at least one structural or functional index matches one of the product processing feature range sets in the records then, selecting the first cultivar
10 and recommending the first cultivar for growing under the given set of growth conditions.

★ 20. The method of claim 19 further comprises the steps of:

(h) if the at least one structural or functional index does not match one of the
15 product processing feature range sets in the records then, searching one or more classes of genome databases for one or more genes that code for the desired product features deficient in the first cultivar and recommending genetic engineering of the first cultivar to introduce said genes into the first cultivar so as to produce a modified cultivar, which modified cultivar produces the selected raw plant product with the at
20 least one structural or functional index that matches one of the records in step (f), or selecting a second cultivar that produces the selected raw plant product with the at least one structural or functional index having the closest match to one of the records in step (f); and reiterating the steps (a) through (h) until the at least one structural or functional index matches one of the product processing feature range sets in the
25 records.

21. The method of claim 20 further comprises the step of:

★ (k) providing a processing control system for selecting one or more genes from one or more classes of genomic databases.

5 22. The method of claim 19, wherein the selected plant product is a group of fruits, a group of tubers, a group of seeds, a group of leaves, a group of vegetative buds, a group of inflorescences, a group of nuts or a group of seeds of the crop plant.

 23. The method of claim 19, wherein analyzing the selected plant product is by means of an imaging system.

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 24. The method of claim 23, wherein the imaging system is a light microscope, fluorescent microscope, spectral microscope, hyper-spectral microscope, electron microscope, confocal microscope or optical coherence tomograph.

15 25. The method of claim 19, wherein the at least one structural or functional index is a plant phenomics index.

 26. The method of claim 25, wherein the plant phenomics is macrophenomics or microphenomics.

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 27. The method of claim 19, wherein the at least one structural or functional index includes a qualitative feature.

 28. The method of claim 19, wherein the at least one structural or functional index includes a quantitative feature.

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 29. The method of claim 19, wherein said processing data include bioprocessing data.

30. A method for a non-random selection of a crop plant that yields a selected raw plant product with uniform features for processing into a uniform quality end product comprising the steps of:

- 5 (a) obtaining a sample of the selected raw plant product of the crop plant;
(b) analyzing the sample to determine at least one structural or functional index associated with the selected raw plant product;

(c) providing a plurality of product feature range set records, wherein each of the product feature range set records associates a given set of genetic information of a cultivar of the crop plant with a corresponding product feature range set and with a
10 corresponding set of growth conditions suitable for growing the cultivar to produce the selected raw plant product with indices that fall within the associated product feature range set;

(d) identifying a first cultivar by comparing the at least one structural or
15 functional index analyzed in step (b) to each of the records in step (c);

(e) providing a plurality of product processing feature range set records, wherein each of the product processing feature range set records associates a given set of product processing data with a corresponding product processing feature range set, and wherein, for each such record, a uniform quality end product results from
20 application of the given set of product processing data to raw product falling within the associated product processing feature range set;

(f) determining the suitability of the sample for processing into the uniform quality end product by comparing the at least one structural or functional index to each product processing feature range set in the records;

25 (g) if the at least one structural or functional index matches one of the product processing feature range sets in the records then, selecting the first cultivar and recommending the first cultivar for growing under the given set of growth conditions;

(h) if the at least one structural or functional index does not match one of the product processing feature range sets in the records then, searching one or more classes of genome databases for one or more genes that code for the desired product features deficient in the first cultivar and recommending genetic engineering of the first cultivar to introduce said genes into the first cultivar so as to produce a modified cultivar, which modified cultivar produces the selected raw plant product with the at least one structural or functional index that matches one of the records in step (f), or selecting a second cultivar that produces the selected raw plant product with the at least one structural or functional index having the closest match to one of the records in step (f), and reiterating the steps (a) through (h) until the at least one structural or functional index matches one of the product processing feature range sets in the records.

31. The method of claim 30 further comprises the step of:

(j) providing a processing control system for selecting one or more genes from one or more classes of genomic databases.

32. The method of claim 30, wherein the selected plant product is a group fruits, a group of tubers, a group of seeds, a group of leaves, a group of vegetative buds, a group of inflorescences, a group of nuts or a group of seeds.

33. The method of claim 30, wherein analyzing the selected plant product is by means of an imaging system.

34. The method of claim 33, wherein the imaging system is a light microscope, fluorescent microscope, spectral microscope, hyper-spectral microscope, electron microscope, confocal microscope, optical coherence tomograph telescope or spectral telescope, MRI or ultrasound.

35. The method of claim 30, wherein the at least one structural or functional index is a plant phenomics index.

5 36. The method of claim 35, wherein the plant phenomics is macrophenomics or microphenomics.

37. The method of claim 30, wherein the at least one structural or functional index includes a qualitative feature.

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38. The method of claim 30, wherein the at least one structural or functional index includes a quantitative feature.

39. The method of claim 30, wherein said processing data include bioprocessing data.

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40. A method for non-random selection of a sample of a living tissue of an organism for processing into a uniform quality end product comprising the steps of:

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(a) analyzing the sample to determine at least one structural or functional index associated with the living tissue;

(b) providing aplurality of product processing feature range set records, wherein each of the records associates a given set of product processing data with a corresponding product processing feature range set, and wherein, for each such record, a uniform quality end product results from application of the given set of product processing data to raw product falling within the associated product processing feature range set;

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(c) determining the suitability of the living tissue for processing into the uniform quality end product by comparing the at least one structural or functional index to product processing feature range sets in the records; and

5 (d) if the at least one structural or functional index matches one of the product processing feature range sets in the records then, selecting the living tissue so that when processed the selected living tissue results in the uniform quality end product.

10 41. An information system for making non-random selection of a of crop plant that yields a selected raw plant product with uniform features for processing into a uniform quality end product comprising:

(a) an analyzing system for analyzing the selected plant product for obtaining information on at least one structural or functional index of the selected raw plant product;

15 (b) a first database that stores information on the at least one structural or functional index analyzed by the analyzing system;

(c) a second database that provides information on the plant genetic variables, product features coded for by the genetic variables under a given set of growth conditions; and

20 (d) a third database that provides processing information to determine processing variables for said structural and functional variables,

wherein the first database is linked to the second database to compare the at least one structural or functional index in the first database with said information in the second database and to the third database to compare the at least
25 one structural or functional index to said processing variables such that the information system facilitates the non-random selection of the crop plant that yields the selected plant product.

42. The information system of claim 41 further comprises a processing control system which is linked to the second database to determine specific genetic variables lacking in the second database to produce a plant product having specific structural and functional features.

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